SEXUAL DIMORPHISM OF TARSAL CLAWS IN ANTHONOMINE WEEVILS (COLEOPTERA: CURCULIONIDAE)[1,2]

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ABSTRACT: Sexual dimorphism of the protarsal claw tooth of several species of anthonomine weevils is discussed and selected examples are illustrated. This dimorphic character occurs in a scattered fashion in the subfamily. In the genus *Anthonomus* it is found mostly in closely related species in the nominate subgenus and in all species of the subgenus *Anthonomorphus*. Other genera containing species with sexual dimorphism of the claws are *Achia, Coccotorus* and *Furcipus*. The character was not found in any other subfamilies of Curculionidae which have toothed claws.

Dieckmann (1968) was the first to point out that some of the European species of the genus *Anthonomous* Germar have sexual dimorphic protarsal claws. In his revision of the Anthonomini of the western Palearctic region he described such claws for *Anthonomus pomorum* L. and *Anthonomus pedicularius* (L.). Morris (1976) briefly mentioned dimorphism in the tarsal claws of *Anthonomus conspersus* Desbrochers and *A. pedicularius*, illustrating the latter. Read (1981) added *Furcipus rectirostris* (L.) to this short list of anthonomine species showing secondary sexual characters of the tarsal claws.

During our study of the systematics of North American anthonomines, we surveyed a wide array of species of the subfamily to determine the incidence and distribution of this dimorphism. Approximately 75 species, representing nearly all of the genera of Anthonominae and subgenera of *Anthonomus*, were investigated. Additional observations were made on several other genera of Curculionidae whose species have toothed tarsal claws similar to those of the anthonomines.

Sexual dimorphism of the tarsal claws in the anthonomines involves only the protarsi. Tarsal claws of weevils in this subfamily are each usually provided with a tooth which arises on the inner surface of the claw near the base. The tooth may be short or it may extend almost the full length of the tarsal claws. Occasionally the tarsal claws of anthonomines are simple and there are a few which have the tooth arising from the underside of the claw rather than on the inside.

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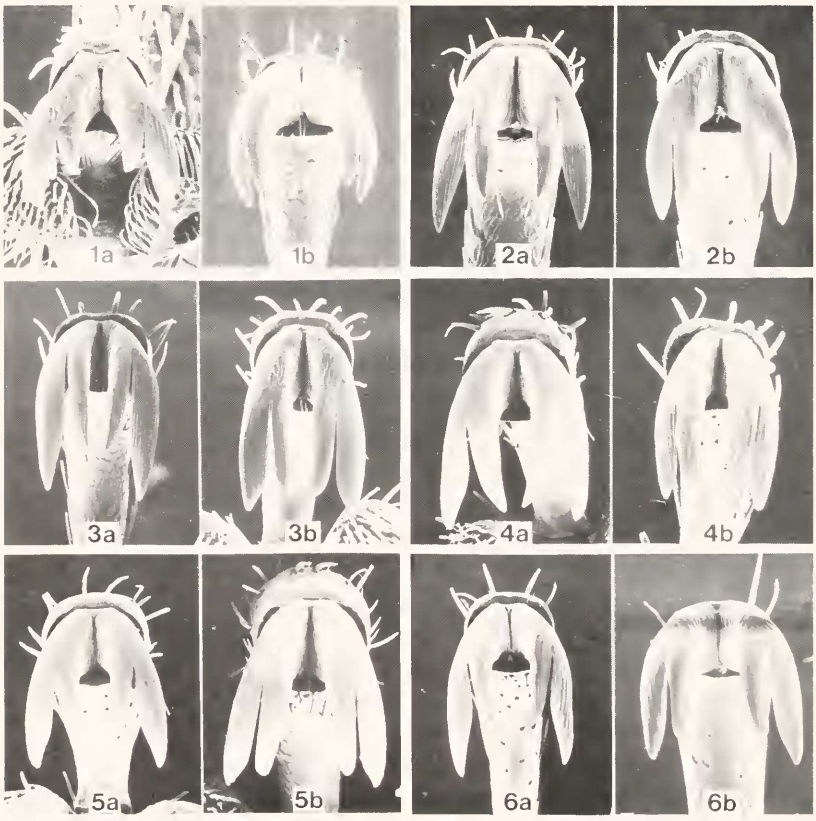
In species where sexual dimorphism is present the tooth on the protarsal claw of the female is usually sharply pointed apically (Figs. 2a, 3a, 4a, 5a, 6a) while that of the male is somewhat rounded and blunt at the apex (Figs. 2b, 3b, 4b, 5b, 6b). The reverse is true in *Anthonomus nebulosus* LeConte where the tooth of the female has a blunt apex (Fig. 1a) and that of the male is more sharply pointed (Fig. 1b). The claw of the female is usually distinctly shorter than that of the male in species with dimorphic claws, although in *Anthonomus texanus* there is only a slight difference in length between the sexes. Another difference noted is that the female tooth often



Figs. 1-6. Protarsal claws of species of *Anthonomus*. In each figure a=female, b=male. Fig. 1. *Anthonomus nebulosus* LeConte. Fig. 2. *Anthonomus grandis* Boheman. Fig. 3. *Anthonomus hunteri* Burke and Cate. Fig. 4. *Anthonomus texanus* Dietz. Fig. 5. *Anthonomus fulvus* LeConte. Fig. 6. *Anthonomus peninsularis* Dietz.

curves inward and forms a greater angle with the claw; the tooth of the male claw lies close to the claw so that the two are more or less parallel.

The distribution of the sexual dimorphic claws in the subfamily is somewhat scattered. In addition to *Anthonomus,* they occur in the genera *Furcipus* Desbrochers, *Coccotorus* LeConte and in some species of *Achia* Champion. Species of *Furcipus* and *Coccotorus* have occasionally been placed in *Anthonomus*, indicating their apparent close phylogenetic relationships to members of the latter genus. Furthermore, this affinity seems to be with species in the nominate subgenus *Anthonomus*, some of which also have sexual dimorphic claws. The majority of species of the subgenus *Anthonomus,* however, are not dimorphic in this character. Species of the subgenera *Anthonomorphus* Dietz and *Parathonomus* Dietz also exhibit dimorphism of the claws; these taxa (at least the latter) are likewise relatively close phylogenetically to the species in the nominate subgenus which are dimorphic. It seems, therefore, that dimorphism of the tarsal claw occurs mostly in a relatively small number of species which have the closest relationships to *A. pedicularius*, the type species of the genus. The presence or absence of tarsal claw dimorphism may therefore be useful as an indicator of phylogenetic relationships in the subfamily. One exception to this general pattern is *Anthonomus testaceosquamosus* Linell. This species, a member of the *A. squamosus* Group, has sexual dimorphic claws but on the basis of overall characters does not appear to be closely related to other species having the character.

Species of the subgenus *Antonomorphus* exhibit more distinct protarsal claw dimorphism than most other anthonomines. There is a relatively small amount of difference in the sexual dimorphic tooth of the claw within this subgenus (Figs. 2-6). *Anthonomus grandis* Boheman and *A. hunteri* Burke and Cate are considered to be closely related (Burke and Cate 1979) on the basis of overall characters and this relationship is also reflected in the tarsal claws (Figs. 2, 3). The most noticeable difference between the claws of the two species is in the more slender tooth of *A. hunteri.* Two other species, *A. texanus* Dietz and *A. cognatus* Burke, are considered by Burke (1964) to constitute a species pair within the subgenus. This relationship is supported by the claw characters. Similarity of claws of the two species is more striking in males than in females. *Anthonomus peninsularis* Dietz is not especially closely related to any of the other species in the subgenus; both males and females have a shorter tooth than that of the other species (Fig. 6). The remaining member of the subgenus, *A. fulvus* LeConte, is a distinctive species which appears to have no close relatives in the subgenus. The female tooth (Fig. 5a) of *A. fulvus* is somewhat intermediate in length between that of *A. peninsularis* and other members of the subgenus. The male tooth (Fig. 5b) is, however, one of the longest in the subgenus.

The basis for the difference in the tarsal claw teeth of the two sexes in these anthonomines is not known. This may be an adaptation in the male which plays some part in grasping the female during copulation. In addition to showing some phylogenetic relationships within the subfamily, the character may also be used with ease to distinguish the sexes.

Relatively few other curculionids have toothed claws like those of the anthonomines. None of the species with toothed claws examined from other subfamilies show sexual dimorphism of the tooth of the tarsal claw.

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